An Overview of Diabetes-Related Eye Disease and Eye Exams in Utah

An Annual Exam: Do the Eyes Have It?

One of the most devastating complications of diabetes is vision loss or deterioration. Diabetes is the leading cause of new blindness among adults ages 20 to 74. Each year, between 12,000 and 24,000 Americans become blind from diabetes-related causes. For Utah, the best estimate suggests that between 85 and 170 residents become blind each year as a result of diabetes.[1]

The three primary vision complications of diabetes are: retinopathy, cataracts, and possibly glaucoma.[2-3] Diabetic retinopathy, in particular, is one of the most devastating complications of diabetes, accounting for at least 12 percent of new cases of blindness in the United States. Retinopathy can be mild to severe, with minimal vision loss to total blindness. Approximately 35,000 Utahns currently suffer from diabetic retinopathy.[4] People with diabetes are almost twice as likely to develop glaucoma as people without diabetes. Similarly, they are twice as likely to develop cataracts as people without diabetes, and to develop them at an earlier age.

The risk of developing diabetes-related eye disease increases the longer a person has diabetes. At least seven out of ten people with type 1 diabetes will develop diabetic retinopathy within 20 years of being diagnosed. As many as one in five people with type 2 diabetes have retinopathy when they are first diagnosed with diabetes. The majority will develop mild to severe retinopathy.[5]

High blood sugar and high blood pressure can cause the eyes' tiny blood vessels to swell and weaken, inhibiting blood flow. New vessels develop to compensate, but the new vessels are weak, subject to leakage, and likely to form scar tissue.[6] Leaking blood keeps light from reaching the retina and surgery is often required to remove it. The weak vessels can also form scar tissue that can lead to a detached retina. In the early stages, vision loss may not be evident. A dilated eye exam could detect retinopathy before vision loss becomes untreatable.

Risk of developing diabetes-related eye disease increases with duration of diabetes, history of hyperglycemia, and history of hypertension.

Looking at Ways to Reduce the Risk of Developing Diabetic Retinopathy

The risk of developing retinopathy, or progression in existing retinopathy, is substantially reduced with tight blood glucose control. Reduction of risk of onset and progression of retinopathy for type 1 patients is well documented in the Diabetes Control and Complications Trial (DCCT), completed in 1993.[7] For participants in this study, tightly controlled blood sugar reduced this risk as much as 76 percent. Even more recently, a study conducted at the Institute of Diabetes Care and Research in Tokyo found similar results for type 2 patients.[8] For 787 patients who were followed for an average of seven years, a one percent decrease in HbA1c levels was associated with a 35 percent reduction in the risk of developing retinopathy.

Watch for These Warning Signs of Vision Loss

- **Blurry or double vision**
- **Rings, flashing lights, or blank spots**
- **Dark or floating spots**
- **Pain or pressure in one or both eyes**
- **Trouble seeing things out of the corners of the eyes**
- ***The most important thing to remember: THERE MAY BE NO WARNING SIGNS***

Eye-to-Ojo: Non-Hispanic/Latino-to-Hispanic/Latino Comparisons in Eye Care

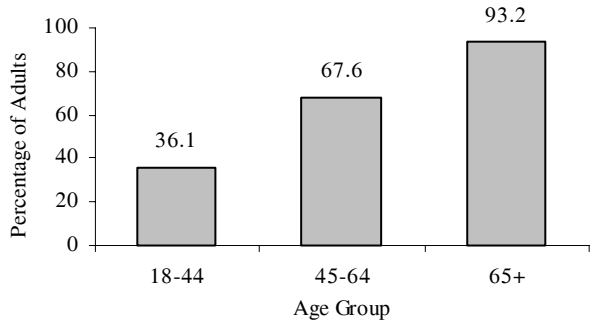
There is considerable evidence suggesting that Hispanic/Latino persons, particularly those age 40 and over, face a high risk of experiencing diabetes-related vision loss.[9] A prominent national study, conducted jointly by the National Eye Institute and the National Center on Minority Health and Health Disparities, found that Hispanic/Latino adults age 40 and over with diabetes have the highest risk of developing retinopathy among all racial/ethnic groups.[10] Mexican-American persons seemed to have a particularly high risk of retinopathy. Fifteen percent were diagnosed with diabetes during an initial eye exam. Of those, 23 percent had already developed mild to moderate retinopathy by the time of diagnosis, and nine percent had advanced retinopathy.

The Bureau of Health Promotion, Utah Department of Health, recently completed a survey to assess the health status and care of 939 Utah Hispanic/Latino adults.

- Just over one-third of Hispanic/Latino adults aged 18 to 44 with diabetes (36.1 %) had a dilated eye exam within the 12 months prior to the survey (Figure 1).

- Two-thirds (67.6%) of Hispanic/Latino adults aged 45 to 64 had an exam in the past 12 months, and almost all (93.2%) of adults 65 and over had an exam.

Figure 1. Percentage of Utah Hispanic/Latino Adults with Diabetes Who Reported Having at Least One Eye Exam During the Previous 12 Months by Age Group



Source: Utah Hispaic Health Survey, 2001

Table 1. Average Age, Duration, Percentage with Eye Disease and Percentage with Eye Exam in Past 12 Months for Utah Hispanic and Non-Hispanic Adults, 40 and Over, 2001

Characteristic	Hispanic Adults (n=36)	Non-Hispanic Adults (n=145)
Percentage with eye exam in prior 12 months	71.2	68.8
Percentage told diabetes had affected eyes	27.5	19.3
Average duration of diabetes in years	8.0	7.7
Average age	54.8	68.8

Sources: Utah Hispanic Health Survey, 2001; Utah Behavioral Risk Factor Survey, 2001

Findings from two recent surveys are shown in Table 1.

- Among Utah adults, aged 40 and over, Hispanic adults were slightly more likely than non-Hispanic adults to have had an eye exam within the 12 months prior to the survey, 71.2 percent vs. 68.8 percent.

- However, over one in four (27.5%) of Hispanic adults had been told by a health care professional that diabetes had affected their eyes, compared to about one in five (19.3%) of non-Hispanic adults.

- While Hispanic and non-Hispanic adults had a similar average duration of diabetes (8.0 years vs. 7.7 years, respectively). Hispanic adults in the survey were 12 years younger than non-Hispanic adults at the time of onset of diabetes.

Eye-Opening Findings from the Utahns with Diabetes Survey

• Respondents with type 1 diabetes were 50 percent more likely to report they had any diabetes-related eye disease than respondents with type 2 diabetes.

• Respondents with type 1 diabetes were almost three times more likely to report they had retinopathy than respondents with type 2 diabetes.

• Of respondents who had diabetes less than 20 years (*n=256*), 6.7 percent reported having diabetic retinopathy.

• Of those who had diabetes for 20 years or more (*n=55*), 43.0 percent had retinopathy (not shown in table).

• Respondents with type 1 diabetes were somewhat more likely to report having glaucoma and cataracts than respondents with type 2 diabetes.

• Respondents with type 1 diabetes were more likely to have had an eye exam in the 12 months prior to the survey than those with type 2 diabetes.

• Respondents with type 1 diabetes were more likely to report their primary care providers referred them to an eye care specialist for an eye exam than respondents with type 2 diabetes.

Table 2. Numbers and Percentages of Utahns, Age 40 and Over, with Eye Disease and Exam Status by Type of Diabetes

Condition	*Type 1 (n=41)*	*Type 1 Percentage*	*Type 2 (n=283)*	*Type 2 Percentage*	*Total (n=321)*	*Total Percentage*
Eye Disease						
Retinopathy	*12*	*30.3*	*29*	*10.2*	*41*	*12.7*
Cataracts	*15*	*37.5*	*90*	*31.8*	*105*	*32.5*
Macular Degeneration	*5*	*13.0*	*25*	*8.9*	*31*	*9.4*
Eye Exam						
Had eye exam in past 12 months	*35*	*85.1*	*210*	*74.3*	*245*	*75.7*
Doctor referral to eye specialist	*27*	*66.3*	*179*	*63.4*	*206*	*63.8*

Respondents who didn't know which type of diabetes they had were excluded from the analysis.
Note: Some percentages should be interpreted with caution due to small numbers, especially those for respondents with type 1 diabetes.

Prevention of Eye Disease from the Primary Care Providers' View

Appropriate screening and eye care could prevent much of diabetesrelated blindness.[11] A recent survey of 411 Utah primary care providers indicated they recognize the importance of regular eye exams and routinely refer most of their patients with diabetes to an eye care specialist annually (See Tables 3 and 4).

- Approximately nine out of ten primary care providers routinely refer their patients with diabete for a dilated eye exam annually.
- Providers were slightly more likely to routinely refer their type 1 patients for a dilated eye exam than their type 2 patients.
- Urban providers were more likely than rural providers to refer their patients to an ophthalmologist and were more likely to refer annually.
- Providers who had participated in a continuing education course during the two years prior to the survey were more likely to refer their patients annually than their counterparts who did not participate in a course.

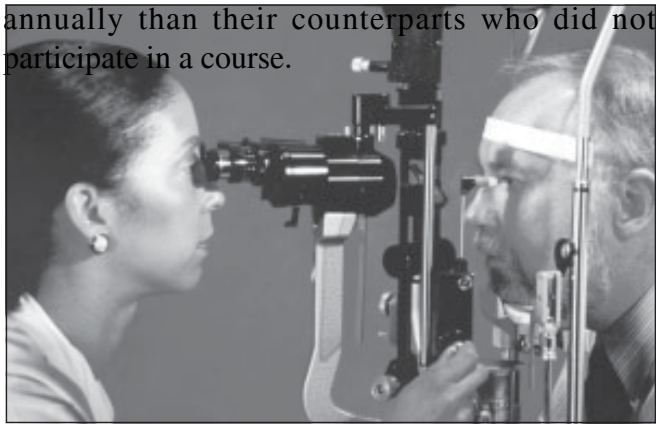


Table 3. Percentage of Providers Routinely Referring All Patients with Type 1 Diabetes to an Eye Care Specialist for a Dilated Eye Exam (n=381)

Provider Characteristics	Percentage Routinely Referring Patients	Percentage Referring to an Ophthalmologist	Percentage Referring Yearly
Practice Location			
Urban	90.7	93.6	93.2
Rural	90.2	78.0	84.7
Had Continuing Education Course on Diabetes in Past Two Years			
Yes	93.2	90.0	92.8
No	83.3	89.5	84.9

Table 4. Percentage of Providers Routinely Referring All Patients with Type 2 Diabetes to an Eye Care Specialist for a Dilated Eye Exam (n=388)

Provider Characteristics	Percentage Routinely Referring Patients	Percentage Referring to an Ophthalmologist	Percentage Referring Yearly
Practice Location			
Urban	87.8	92.8	88.3
Rural	82.0	78.2	84.0
Had Continuing Education Course on Diabetes in Past Two Years			
Yes	88.3	89.6	88.3
No	80.4	88.7	83.0

Insight into Eye Exams Using HEDIS Measures

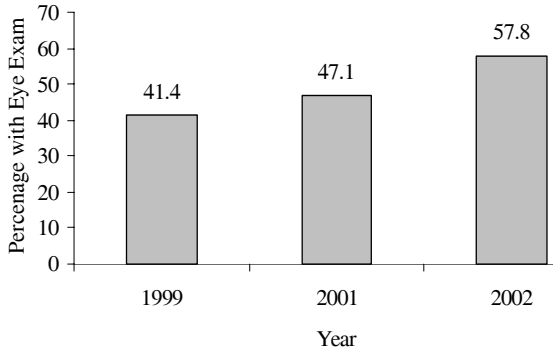
The Utah Diabetes Prevention and Control Program (UDPCP) has worked with six health plans since 1999 to collect information on comprehensive diabetes care measures using the Health Employer Data Information Set (HEDIS) methods. Having an eye exam in the prior year is defined as having an eye exam in the last calendar year, or in the past two years if the client met at least two of the following three criteria: had a hemoglobin A1c level under 8 percent, was not using insulin, and had no evidence of retinopathy in the prior eye exam.

The HEDIS eye exam percentages of for 1999, 2001, and 2002 are shown in Figure 2.

- In 1999, about 41 percent of clients in the six health plans met the criteria for having an eye exam. This percentage increased to over 47 percent in 2001.
- In 2002, close to 60 percent of clients in Utah health plans met the criteria for having an eye exam.

It should be noted that the eye exam rates shown in Figure 2 represent documented eye exams, i.e., eye exams that could be verified by a written eye exam report in the patient's medical record or documented by insurance claims. Rates that are self-reported through surveys have consistently been higher. The difference in rates is likely due to over-reporting in surveys and missing documentation in patient medical records. The true rate of eye exams probably lies somewhere between the HEDIS exam rate and self-reported numbers.

Figure 2. Percentage of Client in Utah Health Plans with Eye Exam in Prior Year (Weighted Averages)



Source: Utah HEDIS Meausures 1999-2000

A Vision for the Future

Increasing the number of Utahns who have routine eye exams to detect diabetes-related eye disease at its earliest stages would greatly reduce the risk of blindness and its devastating consequences for people with diabetes. One of the national objectives of the U.S. Department of Health and Human Services is to increase the proportion of adults with diabetes who have an annual dilated eye exam(HP 2010 Objective 5-13).

In order to ensure that Utahns with diabetes obtain appropriate preventive care, the UDPCP organized the Utah Diabetes Guidelines Committee in 1999. This committee, comprised of Utah providers and other health care professionals, reviewed and evaluated available guidelines and care recommendations for a variety of services for Utahns with diabetes. After careful review, the committee developed the Utah Diabetes Practice Guidelines. The latest recommendations for eye care developed by the committee are listed below.

Healthy People 2010 Objective 5-13: Increase the proportion of adults with diabetes who have had an annual dilated eye examination

Utah Diabetes Provider Recommendations

Patients with type 1 diabetes should be referred to an ophthalmologist or retinal specialist for an initial dilated eye exam five years after diagnosis or at age 10.[12] Type 2 patients should be referred upon diagnosis.

Patients should be referred immediately if a routine exam shows acute changes of vision or if physical exam reveals any retinal change. Females should be referred during the first trimester of pregnancy, or prior to an expected pregnancy if possible. Differences between the eye exam schedules for HEDIS and the ADA Standards of Care should be noted. HEDIS measures are meant to be used as outcome measures for large HMO populations and are not intended to serve as a standard of care for individual diabetes patients.

Table 4. Recommended Visit Schedule for Type 1 and Type 2 Patients with Diabetes

Condition	Every 3 months	Every 4 months	Annually
No retinopathy or microaneurysms only			X
Mild to moderate nonproliferative retinopathy with edema not threatening the macular center		X	
Severe or very severe nonproliferative retinopathy	X		

Source: Utah Diabetes Prevention and Control Program, Utah Diabetes Practice Guidelines and Targets: 1999, Utah Department of Health

Acknowledgments

The following individuals have contributed to the development of this report:

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Resources

American Academy of Ophthalmology
655 Beach Street
San Francisco, CA 94109-7424
(415) 561-8500
http://www.aao.org

American Optometric Association
243 Lindbergh Boulevard
St. Louis, MO 63141
(314) 991-4100
http://www.aoanet.org

Low Vision Rehabilitation Services
Physician's Tower #3
324 Tenth Avenue, #155
Salt Lake City, UT 84103
(801) 408-3937

Low Vision Services
Division of Services fo r the Blind and Visually Impaired
250 North 1950 West, Suite B
Salt Lake City, UT 84116-7902
(801) 323-4373
1-800-284-1823, Ext. 373
Fax: (801) 323-4396

National Eye Institute
2020 Vision Place
Bethesda, MD 208923655
(301) 496-5248
http://www.nei.nih.gov

American Diabetes Association
1701 N. Beauregard Street
Alexandria, VA 22311
(703) 549-1500
1-800-342-2383 (1-800-DIABETES)
http://www.diabetes.org

Friends for Sight
661 South 200 East
Salt Lake City, UT 84111
(801) 524-2020
1-800-576-LOOK (1-800-576-5665)
www.for-sight.com

Prevent Blindness America
500 East Remington Road
Schaumburg, IL 60173
1-800-331-2020
(847) 843-2020
http://www.preventblindness.org
Prevent Blindness America offers a Near Vision Test on its website at:
http://www.preventblindness.org/eye_tests/near_vision_test.html

For more information, contact the Utah Diabetes Prevention and Control Program, 801-538-6141 or visit the website: http://health.utah.gov/diabetes

References

1. American Diabetes Association 2002. State estimates were derived applying national rates to the Utah population with diabetes [an estimated 120,000 Utahns have diabetes (diagnosed and undiagnosed)]. Note that the numbers are only estimates, calculated by applying rates from the Massachusetts Diabetes Registry to the Utah population.

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11. Ellis, JD, Morris, AD, & MacEwen, CJ. Should Diabetic Patients Be Screened for Glaucoma? DARTS/Memo/Collaborative. *British Journal of Ophthalmology* 1999 83: 369-372.

12. The latest ADA guidelines suggest patients with type 1 diabetes should have an eye exam within three to five years after the onset on diabetes. See the position statement on Diabetic Retinopathy in the ADA Clinical Practice Guidelines Recommendations 2003, *Diabetes Care* 2003, 26 (1): S101-S102.

The production of this document was funded entirely by a grant through the Centers for Disease Control and Prevention No. U32/CCU815668. Its contents are solely the reponsibility of the authors and do not necessarily represent the official views of CDC. Printed March 2003.